

## *Munburra*, A New Fly Genus from Tropical Australia (Empididae: Empidinae)

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**ABSTRACT.** *Munburra bulbicornis* n.gen and n.sp. (Diptera: Empididae: Empidinae) is described from the Cape York Peninsula, Queensland, Australia. This monotypic genus is distinguished by a large, raised ocellar triangle with enlarged ocelli, and two distinctive male secondary sexual characters, a greatly swollen postpedicel, and a long dorsoapical seta on a narrow unswollen leg I first tarsomere. Although it clearly belongs in the Hilarini, its relationship with other members of the tribe is unclear.

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Australian species in the tribe Hilarini (Diptera: Empididae: Empidinae) are poorly known: there are many undescribed taxa in institutional holdings and probably many more awaiting field collection. This paper describes a new monotypic genus collected at numerous locales on Cape York Peninsula, primarily at light in tropical monsoonal woodlands. Males are distinctive in having swollen antennae and a strong dorsoapical seta on a narrow leg I basitarsus.

### Materials and methods

This study is based on specimens borrowed from the Australian National Insect Collection, Canberra (ANIC), in large part from material collected during the Cape York Peninsula Land Use Survey (CYPLUS). Morphological terminology for the male terminalia is based on Cumming *et al.* (1995). Body length of males is measured from the base of the antennae to the tip of the abdomen. Wing length is the distance from the wing base to apex. The position of features on elongate structures such as leg segments is given as a fraction of the total length, starting from the base.

The relative lengths of the podomeres are representative ratios and not measurements. The ratios for each leg are given in the following formula and punctuation: trochanter

+ femur; tibia; tarsomere 1/ 2/ 3/ 4/ 5. The following abbreviations and terms are used: *MSSC*, male secondary sexual character(s), the non-genitalic characters found only on male body; *I, II, III*, pro-, meso-, metathoracic legs; *C*, coxa; *T*, tibia; *F*, femur; *ad*, anterodorsal; *av*, anteroventral; *dv*, dorsoventral; *pd*, posterodorsal; *pv*, posteroventral; *t*, tarsus; *t<sub>1-5</sub>*, tarsomeres 1 to 5.

### Taxonomy

#### Genus *Munburra* n.gen.

**Etymology.** *Munburra* is a geographic place name near the Mt Webb, Queensland type locality. The name is of aboriginal origin, and the gender is here designated as feminine.

**Type species.** *Munburra bulbicornis* n.sp.

**Diagnosis.** Genus *Munburra*: subfamily Empidinae, tribe Hilarini, with the following characters: laterotergite usually bare; tibia I with anteroapical comb of 8–10 short even setae; cercus usually small and desclerotized, and fused laterally with the surstylus and epandrium; hypandrium usually forming a curved convex hood over the aedeagus along the distal margin; costa circumambient; vein R<sub>1</sub> swollen before it joins the costa.

Generic characters: ocellar triangle large and as rounded mound raised above surface of frons in both sexes; ocelli relatively large, well developed; male postpedicel slightly excavated at base, but basally inflated and tapering subtriangular; frons broad; thorax mostly orange yellow; male  $It_1$  not swollen, but rather thin and slightly curved, with dorsal row of setae, and long curved dorsoapical seta, almost as long as tarsomere; Sc incomplete;  $R_{4+5}$  forked and  $R_4$  with gentle S-shaped curve; hypopygium of the *Hilara-Hilarempis* type, with hypandrial keel narrow and covering aedeagus, cercus small and setose, and epandrium deeply split.

**Remarks.** *Munburra* is a monotypic genus from tropical monsoonal Australia with a single included species, *M. bulbicornis*. It is included in the tribe Hilarini (see Bickel, 1996) based on the characters listed in the Diagnosis, above. The genus is defined by the three apomorphies: a large, raised ocellar triangle with enlarged ocelli, and two distinctive male secondary sexual characters, a greatly swollen postpedicel, and a long dorsoapical seta on a narrow unswollen leg I first tarsomere. I have not seen these character states developed in other genera in the tribe.

Further, the Hilarini are more characteristic of temperate (both Northern and Southern Hemisphere) or montane habitats than the lowland tropics. Certainly many more taxa have been described from temperate regions, and although this may reflect regional collecting bias and/or the absence of netting along streams in the tropics, the Australian tropical fauna is indeed much poorer than that of southern Australia/Tasmania. Therefore the presence of such an unusual genus in the tropics of Cape York Peninsula is of interest.

In some respects, *Munburra* appears similar to the genus *Sphicosa* Philippi, which comprises southern South American species and undescribed Australian species. Although *Sphicosa* is definitely in the tribe Empidini, the two genera appear to have a similar obliquely projecting proboscis (although in *Munburra* it can be elevated and depressed through the oral cavity, and is normally held in a vertical position), a costa reduced in thickness beyond  $R_{4+5}$ , and  $R_1$  is not apically swollen. As well, the hypopygium of some male *Sphicosa* also have a keel-like hypandrium and appears almost hilarine-like. I regard these similarities as homoplasious, part of the suite of characters available for expression across the Empidinae, in both the Empidini and Hilarini.

### *Munburra bulbicornis* n.sp.

Figs 1, 2

**Type material.** HOLOTYPE ♂, Queensland, Mt Webb NP, 3 km NE of Mt Webb, 15°03'S 145°09'E, 2.v.1981, at light, D.H. Colls. PARATYPES, 2♂♂, 4♀♀, same data as holotype, but variously from 30.iv to 2.v.1981 (ANIC).

**Additional material.** Queensland, ♀, 3 km W of Batavia Downs, 12°40'S 142°39'E, 17.i.1993, sweep, P. Zborowski; 2♂♂, 6♀♀, Batavia Downs, 12°39'S 142°42'E, 13–19.i.1993, at light, P. Zborowski, & 2♂♂, 2♀♀, 6–10.i.1993, 6–10.iii.1993, at light, I. Cunningham; 5♂♂, 8♀♀, Bertie Ck, 1 km SE of Heathlands, 11°49'S 142°30'E, 15–26.i.1992, at light, I.D. Naumann & T. Weir; 5♂♂, Cockatoo Ck, 17 km NW of Heathlands, 11°38'S 142°27'E, 15–26.i.1992, open forest, malaise trap, I.D. Naumann & T. Weir; ♂, 2♀♀, Davies Ck, 17 km SE of Mareeba, 17°01'S 145°35'E, 2.ii.1988, D. Rentz (all ANIC).

**Description.** *Male.* length: 2.3–2.4 mm; wing: 2.8×1.1 mm. *Head* spheroidal, with dark brown cuticle; post-occiput,

vertex, frons, face and gena covered with pale grey pruinosity; post-occiput convex; long postorbitals present on dorsal half of head; 2 pairs of vertical setae present, with outer pair stronger; only short postverticals present; ocellar triangle large and distinctly raised as rounded mound above surface of frons; ocelli relatively large, well developed; short setae present on ocellar triangle; pair of long diverging setae arising anteriorly of lateral ocelli; frons broad, slightly wider than ocellar triangle, with 2–3 pairs of setae present medial of lateral margin; eye facets of uniform size; eyes slightly notched laterad of antennae; face slightly wider than frons; female frons and face of similar width; face and clypeus relatively short; buccal cavity wide; palpus elongate, curved, slightly clubbed, with some long subapical dorsal and lateral setae; proboscis dark brown, length about head height, and projecting ventrally; antenna dark brown; scape and pedicel short; pedicel with some short apical setae; postpedicel slightly excavated at base, and basally inflated and tapering subtriangular; style aristate with short basal segment. *Thorax* almost entirely orange yellow, except for narrow brown stripe extending across mesonotum between ac band and extending onto scutellum, and lateral dark brown area just posteriorly of mesonotal suture, and dorsad of wing base; setae dark brown; acrostichal setae (ac) short biseriate, with 10 pairs; dorsocentral setae (dc) present as three setae on posterior slope (two strong setae with shorter seta between), and extending anteriorly as 11–12 short setae; 1 postalar seta, 2 postsutural supra-alar seta with some short setae anteriorly, 3 short presutural intra-alar setae present; notopleuron with 2 strong posterior setae with 4–5 short hairs anteriorly; 1 postpronotal seta present; pronotum with pair of diverging dorsal setae; proepisternum and laterotergite bare; scutellum with pair strong median setae, and pair of short laterals. *Legs* all coxae and remainder of legs pale yellow, with distal tarsomeres infuscated; major setae brown; coxae with long fine pale hairs; all tarsi with paired black claws and yellow pulvilli; CI with 2–3 distolateral setae I: 3.1; 3.2; 1.5/ 0.4/ 0.3/ 0.3/ 0.4; FI with row of longer pd setae; TI flattened anteroposteriorly, with mostly bare anterior and posterior surfaces, and with row of short dorsal setae (all MSSC); TI with anteroapical comb comprising 7–8 pale setae;  $It_1$  not swollen, but rather thin and slightly curved, with dorsal row of setae, and long curved dorsoapical seta, almost as long as tarsomere (all MSSC); CII with some anterior and lateral setae; II: 3.1; 2.9; 1.2/ 0.4/ 0.3/ 0.3/ 0.4; FII with row long curved av setae; TII setose with some longer dorsal and ventral setae; CIII with 3 lateral setae and long posterior seta; III: 3.7; 3.5; 1.7/ 0.8/ 0.4/ 0.3/ 0.5; FIII also with row of longer av setae, and with row of long dorsal setae; TIII setose, with some longer dorsal and ventral setae, and with pair apical of av and pv spine-like setae; III $It_1$  with some long dorsal setae. *Wing* hyaline with brownish veins; costa circumambient, although reduced in thickness along posterior wing margin; costa with strong basal ad setae; Sc incomplete but approaching costa in some specimens;  $R_1$  distally swollen before joining costa;  $R_{4+5}$  forked and  $R_4$  with gentle S-shaped curve; stigma absent; crossvein closing anal cell (cell cup) strongly recurrent; distinct anal vein short but trace fold extending to margin; anal angle well developed; lower calypter yellow with short pale setae; halter yellow. *Abdomen* tergum I narrow and mostly yellow; terga 2–7 brown; sterna mostly yellowish; vestiture yellow; terga 2–5 each with 2–3 lateral abdominal plaques;

hypopygium (Fig. 2b) mostly dark brown, but apical hypandrial keel yellow and almost translucent; cercus small and bearing 3 strong apical setae; hypandrium narrow, and covering aedeagus; aedeagus elongate and conforming to the curvature of the hypandrium; epandrium deeply split and setose, with external spine-like projection.

Female: similar to male except lacking MSSC, and as noted: frons width similar, and head (Fig. 2c) also with raised ocellar triangle; postpedicel not swollen; relative podomere ratio similar; TI not flattened, without row of dorsal setae, and without bare surface; tarsus I dark brown;  $It_1$  straight, without dorsal row of setae, and lacking long dorsoapical seta; TIII not flattened; strong anal angle also present; abdominal terga gradually becoming narrow in width posterior of segment 5.

**Remarks.** *Munburra bulbicornis* is known primarily from the monsoonal woodlands of Cape York Peninsula, Queensland. However, it has also been collected in mixed eucalypt forest/rainforest along Davies Creek, southeast of Mareeba, Atherton Tablelands. All specimens were collected between January and early May, during the rainy season and its immediate aftermath, when maximum surface water is present. *Munburra bulbicornis* is attracted to light, which might be correlated with the enlarged ocelli. Nothing is known of the species' mating behaviour, although other Hilarini are known to form horizontal swarms over water, often with male presentation of nuptial gifts (see Cumming, 1994).

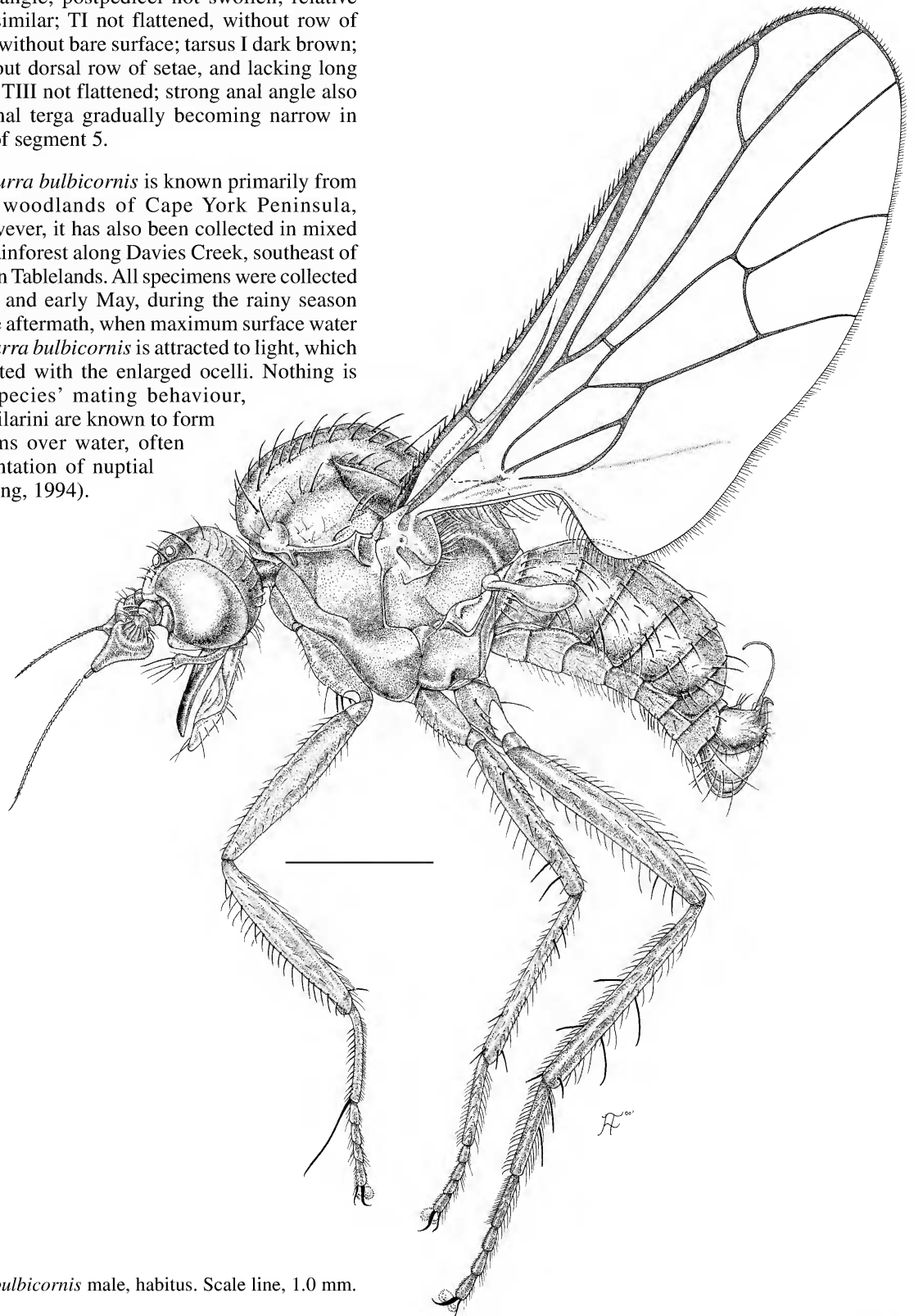


Fig. 1. *Munburra bulbicornis* male, habitus. Scale line, 1.0 mm.

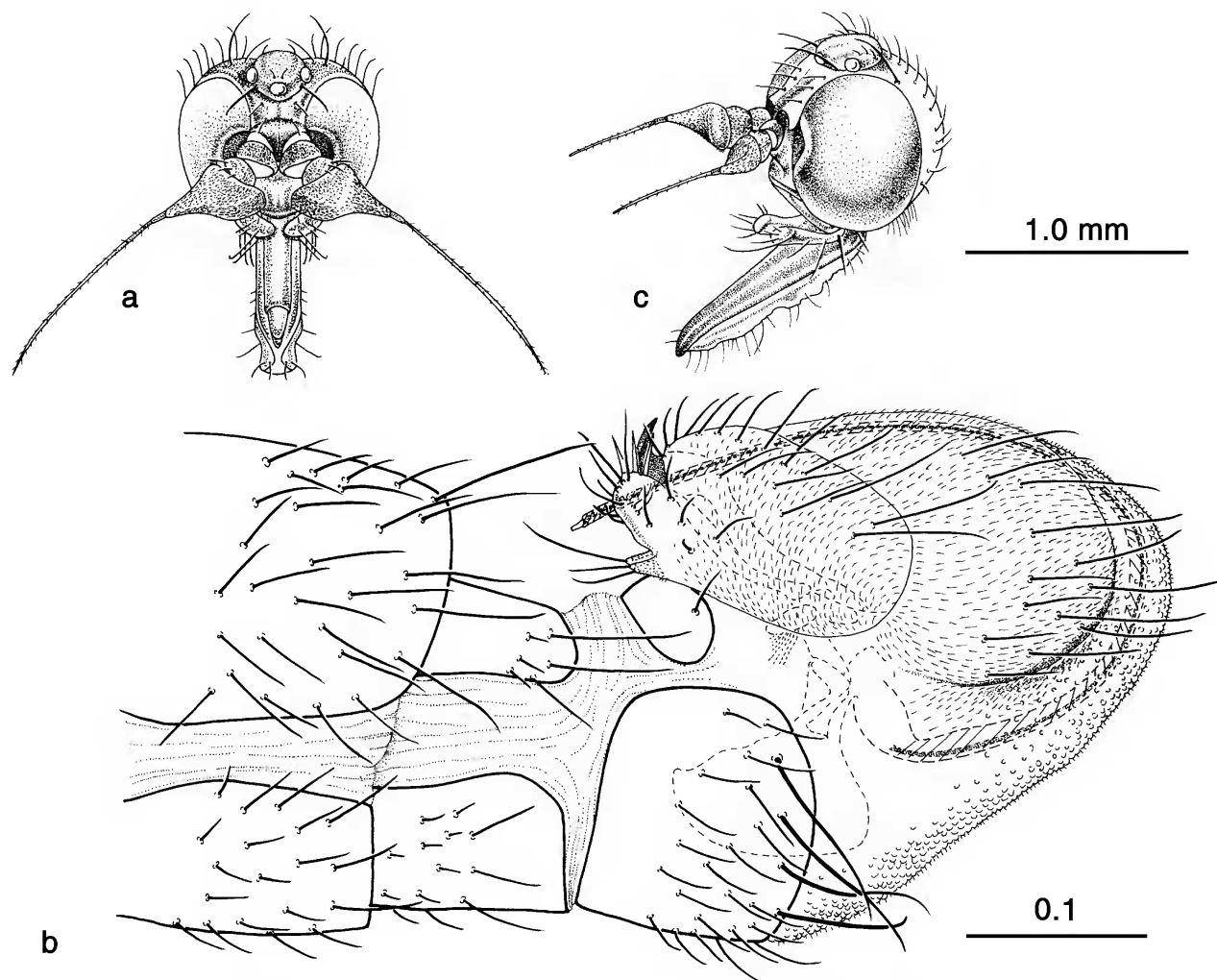


Fig. 2. *Munburra bulbicornis*, (a) male head, anterior; (b) male postabdomen, left lateral; (c) female head, anterolateral.

#### Notes on morphology and systematics

The following characters are useful in any phylogenetic analysis involving *Munburra*. Characters are given in the following format: "Character: plesiomorphic (ancestral) state/apomorphic (derived) state".

- 1 Ocellar triangle: unmodified/distinctly raised with enlarged ocelli. The ocellar triangle of *Munburra* is distinctly swollen and raised above the surface of the frons in both sexes, a condition that appears to be unique to the genus.
- 2 Postpedicel: unmodified/swollen in male. The postpedicel of *Munburra* is distinctly swollen in the male.
- 3 Male basitarsus I: unmodified/swollen or otherwise modified. Most male Hilarini (particularly the *Hilara-Hilarempis* complex of genera) have a swollen basitarsus I, which is known to have silk-producing glands in some taxa. However, in *Munburra*, the male basitarsus I is not swollen, but is thin and slightly curved and with a long dorsoapical seta, almost as long as the tarsomere. The *Munburra* male basitarsus I is unique to the genus, but its ancestral state could either be an unmodified tarsomere or the swollen *Hilara* type of basitarsus.

- 4 Vein Sc: complete/incomplete. This character is variable throughout the Empididae. The plesiomorphic condition is considered to be Sc complete and fusing with the costa.

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#### References

- Bickel, D.J., 1996. *Thinempis*, a new genus from Australia and New Zealand (Diptera: Empididae), with notes on the tribal classification of the Empidinae. *Systematic Entomology* 21: 115–128.
- Cumming, J.M., 1994. Sexual selection and the evolution of dance fly mating systems (Diptera: Empididae: Empidinae). *Canadian Entomologist* 126: 907–920.
- Cumming, J.M., B.J. Sinclair & D.M. Wood, 1995. Homology and phylogenetic implications of male genitalia in Diptera—*Eremoneura*. *Entomologica Scandinavica* 26: 121–151.

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